Amendments to Specification

Please amend the specification as follows.

At page 11, lines 7-9, delete original Equation 13

$$[[S(c,N_{kn}) = \frac{1+\frac{(1.662+19.66\cdot c-47.027\cdot c^2)}{N_{kn}}}{1+.9489\cdot N_{kn}}.]]$$

and insert the following:

$$S(c,N_{kn}) = 1+\frac{(1.662+19.66\cdot c-47.027\cdot c^2)\cdot N_{kn}}{1+.9488\cdot N_{kn}}.$$

At page 14, line 1, delete original Equation 16

$$[[\frac{\text{Hydrohead}_{act}}{\text{Hydrohead}_{max}} = 613\cdot\frac{D_{fS}}{D_{fL}}\cdot\frac{GPD\cdot Bwt(g/m^2)}{\sqrt{1+0.0867\cdot\frac{(D_{fL}/D_{fS})^2}{c^2}}}.]]$$

and insert the following:

$$\frac{Hydrohead_{act}}{Hydrohead_{max}} = 613\cdot\frac{D_{fS}}{D_{fL}}\cdot\frac{c_L}{c_s}\cdot\frac{GPD\cdot Bwt(g/m^2)}{\sqrt{1+\frac{0.0867}{c_L^{\,2}}}}.$$

At page 14, lines 4-9, amend the paragraph as follows:

Here, $Hydrohead_{act}$ is the hydrohead actually achieved. $Hydrohead_{max}$ is the maximum hydrohead the barrier layer can achieve, given by Equation 5. D_{fS} and D_{fL} are the diameters of the small barrier layer fibers and the large support fibers respectively. GPD is the tensile strength of the barrier layer fibers in grams per denier. Bwt is the basis weight of the barrier layer. The solids volume ~~fraction is c~~ fractions are c_S and c_L for the layer of small fibers and the layer of large fibers respectively.

At page 14, line 13, bridging to page 15, line 6, amend the paragraphs as follows:

If the barrier layer of Model 2 consisting of polypropylene (ρ_f = 920 kg/m^3) fibers of diameter D_{fS} = 0.6 micrometers (Frazier = 10 m^3/m^2-min, **[[c]]** $c_S = c_L$ = 0.1, GPD = **[[1]]** 0.1 gram per denier, and Bwt = 1 g/m^2) is laminated to a support layer with fibers of diameter D_{fL} = **[[12]]** 18 micrometers, then Equation 16 gives:

$$\frac{Hydrohead_{act}}{Hydrohead_{max}} = \text{[[0.52]] } 0.66 \quad . \qquad \text{(Equation 17)}$$

The maximum potential hydrohead for the barrier layer as obtained from Equation 5 is 415 cmwc, but at a basis weight of 1g/m^2, the layer is strong enough to withstand only about ~~half~~ two thirds of that pressure before collapsing. The maximum hydrohead could be realized by ~~doubling~~ increasing the basis weight of the barrier layer by about 50 %, but ~~doubling~~ the basis weight increase would reduce the air permeability of the composite fabric by ~~half~~ about 1/3. There would be an economic penalty as well for the higher basis weight.

An alternative solution is to reduce the pore size of the support layer by reducing the support layer fiber size. Per Figure 7, the $Hydrohead_{act}/Hydrohead_{max}$ curve for GPD x Bwt = **[[1]]** 0.1, reaches unity when the ratio D_{fS}/D_{fL} = **[[0.075]]** 0.5. So the maximum hydrohead possible can be realized if the support layer fiber diameter is reduced to about **[[8]]** 12 micrometers. If the basis weight of such a support layer is less than about **[[9]]** 10 grams/m^2, per Equation 7, the Frazier air permeability, is still about 10 m^3/m^2-min.